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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,254	11/14/2003	Yoshitaka Bito	16869C-013610US	3838

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EXAMINER
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WOODS, ERIC V

ART UNIT	PAPER NUMBER
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2672

DATE MAILED: 05/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/714,254	<b>Applicant(s)</b> BITO ET AL.	
	<b>Examiner</b> Eric V Woods	<b>Art Unit</b> 2672	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 November 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                        |                                                                                         |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                            | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

## **DETAILED ACTION**

### ***Specification***

1. Examiner accepts the specification, title, and abstract.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Drawings***

2. Examiner accepts the drawings.

### ***Notes***

3. The claimed embodiment of data structure shown in Fig. 1 of the instant application is a data cube. Data cubes are well known in the art; see for example the seminal Microsoft™ research paper on the subject by Gray et al ("Data Cube: A Relational Aggregation Operator Generalizing Group-By, Cross-Tab, and Sub-Totals\*"), which was published in 1997. Therefore, in subsequent paragraphs and in rejections below, such a structure will be referred to as well known and the support will already have been provided in this paragraph. Application of such is well known in the art for various data sets (see for example Cole et al (US 2005/0073910 A1)(Fig. 5), Haas et al (US 6,771,798 B1), et cetera).

### ***Claim Objections***

4. Applicant is advised that should claim 16 be found allowable, claim 18 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both

cover the same thing, despite a slight difference in wording, it is proto after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-8, 11-21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sang'udi et al. (US 6,480,194 B1)('Sang').

7. As to claim 1, Sang teaches a method for analyzing process data, said method comprising:

Displaying said process data in a first image, said first image representing first and second dimensions associated with said process data (Sang, figure 1, scatter data visualization 110);

Displaying said process data in a second image, said second image representing a third dimensions associated with said process data (Sang, Summary window 120, where specifically, Sang slider 130, and the grid points 125, are the "image representative of one dimension of data.");

Receiving a region of interest, selected from one of said first image and said second image (Sang, navigation path, column 8, lines 21-23);

Calculating a first subset of said process data, said first subset comprising values present in said selected ROI (Sang does not explicitly disclose this limitation; however, Sang's data visualization is formed covering actual and interpolated data at the selected month (Sang, col. 8, lines 4-15) suggests Applicant's calculating a first subset of said process data as claimed. It would have been obvious to one of ordinary skill in the art at the time the invention was made to calculate or interpolate the data points so that an animation can proceed along navigation path and it enables user to observe changes in the data visualization more easily and smoothly.)

Redrawing one of said first image and second image based upon said first subset of said process data (Sang, col. 8, lines 16-20), wherein said first image is redrawn if said ROI is from said second image and said second image is redrawn if said ROI is from said first image (Sang, col. 8, lines 16-20). (As taught in 8:25-9:15, the path slider and animation control panel can be set using a data path created by the user, or by clicking on a selected point in either window, e.g. the user can choose a point in the total sales column (e.g. summary window 120) as taught in 5:45-6:20 where the user can select a point and the animation / path will move to that point based on user selection in either window.)(Furthermore, this is a trivially obvious variant and well known in the art. Obviously, if the user selects a fixed point in one window, e.g. a time point, the user would not want the window that they clicked in to change; rather the user wants to see the data visualization in the other dimensions at that point, e.g. if the user selects a total sales point on the summary window 120, they want to see changes in the specific sales for the time in the main window on the left.)

Sang'udi teaches that since the data visualization 110 only shows a snapshot of entire data (col. 7, lines 50-55), the region of interest can be selected to display data within this region (column 8, lines 16-47) through the animation.

In short, Sang teaches all of the limitations of the above-recited claim as set forth above. It would have been obvious to one of ordinary skill in the art at the time the invention was made to calculate or interpolate the data points so that an animation can proceed along navigation path and it enables user to observe changes in the data visualization more easily and smoothly.

8. Claim 2 adds into claim 1, wherein one of said first, second, third dimensions comprising at least one of a process dimension, a time dimension, and type of procedure dimension (Sang, col. 16, lines 50-64), wherein for example Fig. 2B illustrates a time dimension and Fig. 2A illustrates a "type of procedure" and further so does Fig. 7 where types of cars and their makes and models are listed, and further in 7:10-7:55, or finally age in Fig. 2B could be a type of procedure, where it is taught that specific types of stores can be on one axis where the sale of a specific product represents a "type of procedure" wherein a sale is prima facie a type of procedure, and total sales represent a process dimension axis, obviously the axes are selectable by entity regardless of the nature of it, see for example Fig. 5).

9. Claim 3 adds into claim 1, said first image and said second image each comprising at least one of a two dimensional graph (Sang, figures 1-3 and 8-11).

10. Claim 4 adds into claim 1, said first image and said second image each comprising a first two dimensional map and a second two dimensional map indicating

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four dimensional data (Sang, col. 9, lines 25-54, and further multiple summary windows with maps clearly constitutes that, and the fourth axis would be time (a la Fig. 2B)).

12. Claim 5 adds into claim 1, said first image and said second image each comprising a 2D scatter graph indicating a distribution of said process data (Sang, col. 9, lines 25-54).

13. Claim 6 adds into claim 5, said one-dimensional graph comprising at least one of a bar graph and a line graph (Sang, col. 22, line 60-col. 23, line 5).

14. Claim 7 adds into claim 1, indicating at least one correlation between said three dimensions using a third image (Sang, col. 14, lines 15-col. 15, line 7).

15. Claim 8 adds into claim 7, displaying at least two of said first image, said second image and said third image on a computer screen (Sang, figure 1).

16. Claims 12 and 14 are similar in scope to claim 1; they merely recite an apparatus that performs the method of claim 1, wherein the means specified by the apparatus can clearly be executed on a computer, as set forth in Sang, and the elements consisting of the 'means' language are found, upon comparison, to be functionally equivalent to those of Sang and to be substantially similar in form, thusly meeting the 'means' limitations recited therein. Clearly Sang utilizes a computer system as set forth in claim 12, so the method can be implemented using computer code as recited therein. The rejection to claim 1 is herein incorporated by reference.

17. Claim 13 is the same as in scope as claims 1, 12, and 14 and thusly subject to the same rejection. Sang teaches in Fig. 3 the additional limitations of a processor

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(304); memory (308); a persistent storage (312 – hard drive, 314, removable storage drive); and a bus (306).

18. Claim 15 is the same in scope as claims 1 and 12-14 and is thusly subject to the same rejection. The additional limitations of a database server are met in Sang Fig. 4 – database server 450 with data source 480 which is a database according to Sang (5:45-65 for example). The application server is also server 450, in that the server abstracts the data into three dimensions (435 followed by data miner 490 for abstracting) and forwards the abstracted data file 495 to the client, where it is received. Clearly the database server, application server, and application client (data visualization tool 420 on client workstation 400) are in communication over link 401. Obviously the client provides a plurality of images (wherein by definition a plurality is more than one, inclusive of two) as set forth in the rejection to claims 1 and 12-14 that is herein incorporated by reference.

19. Claim 16 is similar in scope to claim 1; the rejection to said claim is herein incorporated by reference.

20. As to claim 16, Sang teaches a method for analyzing process data, said method comprising:

Abstracting said process data into at least three dimensions (Sang, col. 1, line 64-col. 2, line 4);

Providing a plurality of visualization devices, including a first visualization device and a second visualization device, said plurality of visualization devices enabling



visualization of said process data in at least one of said three dimensions (Sang, figure 2A);

Indicating at least one correlation between at least two of said three dimensions in said first visualization device (Sang, col. 20, lines 15-24);

Indicating a quantity measure by at least one of said three dimensions in said second visualization device (Sang, figure 2B);

Receiving a selection of at least one of a plurality of region of interest, said selection from at least one dimension chosen from among said three dimensions, said selection indicated on at least one of said first visualization device and said second visualization device (Sang, col. 8, lines 16-31)(It is noted that Sang can pick any and many regions of interests by defining different navigation paths (e.g., predefined paths for animation));

Calculating a first subset of said process data, said first subset comprising values present in said ROI (Sang does not explicitly disclose this limitation; however, Sang's data visualization is formed covering actual and interpolated data at the selected month (Sang, col. 8, lines 4-15) suggests Applicant's calculating a first subset of said process data as claimed. It would have been obvious to one of ordinary skill in the art at the time the invention was made to calculate or interpolate the data points so that an animation can proceed along navigation path and it enables user to observe changes in the data visualization more easily and smoothly).

Redrawing said first visualization device and said second visualization device based upon said first subset of said process data (Sang, col. 8, lines 16-20); and

Displaying at least one of a plurality of categorizations of at least one of said three dimensions of said process data in at least one of said first visualization device and said second visualization device (Sang, col. 8, lines 16-20, also see 7:40-55, where it is taught that different categories of stores are shown on the axes).

Ergo, it would have been obvious to one of ordinary skill in the art at the time the invention was made to calculate or interpolate the data points so that an animation can proceed along navigation path and it enables user to observe changes in the data visualization more easily and smoothly. Thusly, Sang teaches or suggests all the limitations of the previous claim

21. As to claim 17, it teaches additional limitations to claim 16. Sang teaches all these limitations.

The method of claim 16 further comprising:

Receiving a second selection of at least one of said plurality of regions of interest, said second selection from at least one dimension chosen from among said three dimensions, said second selection indicated on at least one of said first visualization device and said second visualization device (Sang, col. 8, lines 16-31). It is noted that Sang'udi can pick any and many regions of interests by defining different navigation paths (e.g., predefined paths for animation).

Calculating a second subset of said process data, said second subset comprising values present in said second selections of at least one of said plurality of regions of interest along at least one of said three dimensions (Sang does not explicitly disclose this limitation; however, the fact that Sang's data visualization is formed covering actual

and interpolated data at the selected month (Sang, col. 8, lines 4-15) suggests Applicant's calculating a first subset of said process data as claimed. It would have been obvious to one of ordinary skill in the art at the time the invention was made to calculate or interpolate the data points so that an animation can proceed along navigation path and it enables user to observe changes in the data visualization more easily and smoothly); and

Displaying first subset of said process data and second subset of said process data together using at least one of said first visualization device and said second visualization device (Sang, col. 8, lines 16-20).

As stated above, Sang teaches all of the limitations of the above claim. It would have been obvious to one of ordinary skill in the art at the time the invention was made to calculate or interpolate the data points so that an animation can proceed along navigation path and it enables user to observe changes in the data visualization more easily and smoothly, and to so modify Sang.

22. Claim 18 is a duplicate of claim 16. The rejection to claim 16 is herein incorporated by reference in its entirety.

23. Claim 19 is similar in scope to claim 17, the rejection of which is herein incorporated by reference, with the additional limitations:

Applying a function to said first subset of said process data and said second subset of said process data, yielding a third subset of said process data (Sang, column 8, lines 48-62, e.g., interpolation process); and

Displaying third subset of said process data and second subset of said process data together using at least one of said first visualization device and said second visualization device (Sang, col. 8, lines 16-20).

Therefore, Sang teaches all the limitations, and motivation to modify is taken from claim 16 and incorporated by reference.

24. As to claim 20, Sang teaches a method for analyzing process data, said method comprising:

Abstracting said process data into at least three dimensions (Sang, col. 1, line 64-col. 2, line 4);

Providing a plurality of visualization devices, including a first visualization device and a second visualization device, said plurality of visualization devices enabling visualization of said process data in at least one of said three dimensions (Sang, figure 2A);

Indicating at least one correlation between at least two of said three dimensions in said first visualization device (Sang, col. 20, lines 15-24);

Indicating a quantity measure by at least one of said three dimensions in said second visualization device (Sang, figure 2B);

Receiving a selection of at least one of a plurality of region of interest, said selection from at least one dimension chosen from among said three dimensions, said selection indicated on at least one of said first visualization device and said second visualization device (Sang, col. 4, line 65-col. 5, line 13);

Calculating a first subset of said process data, said first subset comprising values present in said ROI (Sang does not explicitly disclose this limitation; however, Sang's data visualization is formed covering actual and interpolated data at the selected month which (Sang, col. 8, lines 4-15) suggests Applicant's calculating a first subset of said process data as claimed. It would have been obvious to one of ordinary skill in the art at the time the invention was made to calculate or interpolate the data points so that an animation can proceed along navigation path and it enables user to observe changes in the data visualization more easily and smoothly.);

Displaying third subset of said process data and second subset of said process data together using at least one of said first visualization device and said second visualization device (Sang, col. 8, lines 16-20).

Redrawing one of said first image and second image based upon said first subset of said process data (Sang, col. 8, lines 16-20), wherein said first image is redrawn if said ROI is from said second image and said second image is redrawn if said ROI is from said first image (Sang, col. 8, lines 16-20). (As taught in 8:25-9:15, the path slider and animation control panel can be set using a data path created by the user, or by clicking on a selected point in either window, e.g. the user can choose a point in the total sales column (e.g. summary window 120) as taught in 5:45-6:20 where the user can select a point and the animation / path will move to that point based on user selection in either window.) (Furthermore, this is a trivially obvious variant and well known in the art. Obviously, if the user selects a fixed point in one window, e.g. a time point, the user would not want the window that they clicked in to change; rather the use

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wants to see the data visualization in the other dimensions at that point, e.g. if the user selects a total sales point on the summary window 120, they want to see changes in the specific sales for the time in the main window on the left.).

As taught above, Sang teaches all of the above limitations. The rejection to claim 1 is incorporated by reference for certain explanations included therein concerning the refreshing / redrawing of various windows based on which one the user clicks or selects the ROI in. It would have been obvious to one of ordinary skill in the art at the time the invention was made to calculate or interpolate the data points so that an animation can proceed along navigation path and it enables user to observe changes in the data visualization more easily and smoothly.

25. As to claim 21, the method of claim 20 further comprising:

Displaying at least one of a plurality of categorizations of at least one of said three dimensions of said process data in at least one of said first visualization device and said second visualization device (Sang, col. 8, lines 16-20).

Clearly Sang teaches this limitation at the recited location, where clearly the categorization labels of each axis can be seen, as in Figs. 7, where multiple variables (e.g. car names) are known for each axis, and further this is a trivial variant, e.g. sales of different types on one axis (or by specific brand of sales, e.g. by tobacco / cigarette brand, or by type (cigar, chewing tobacco, snuff, cigarette, etc.) – see for example the Gray reference as cited above to prove that it is well known, see page 38 for example).

26. As to claim 23, this is substantially similar to claims 18 and 19 combined, e.g. the limitations of the two claims. As such the rejections to those claims are herein

incorporated by reference. The limitation of redrawing is not included in this claim, and so thusly it is ignored.

The only additional limitation is:

Said third subset of said process data displayed using at least one of a plurality of different colors, a plurality of different intensities of a color, a plurality of different intensities of a plurality of different colors.

Sang teaches all the limitations of this claim. Clearly, in 5:1-15 the data of Sang can be varied as a function of color across the window, and that regions have different colors, and that in Fig. 1 the main regions have different colors (7:25-30), and that different categories to axis have different colors (7:40-50), and finally a color legend is presented in 7:60-8:2, such that the user can distinguish the different colors. Clearly this comprises a 'plurality of colors' thus meeting the recited limitation of the claim. Motivation is incorporated by reference from claim 16.

27. Claim 22 is rejected under 35 U.S.C. 103(a) as unpatentable over Sang in view of Rockland (Rockland, Ronald. "Using Simulation Software in a Transform Analysis Course." 1999).

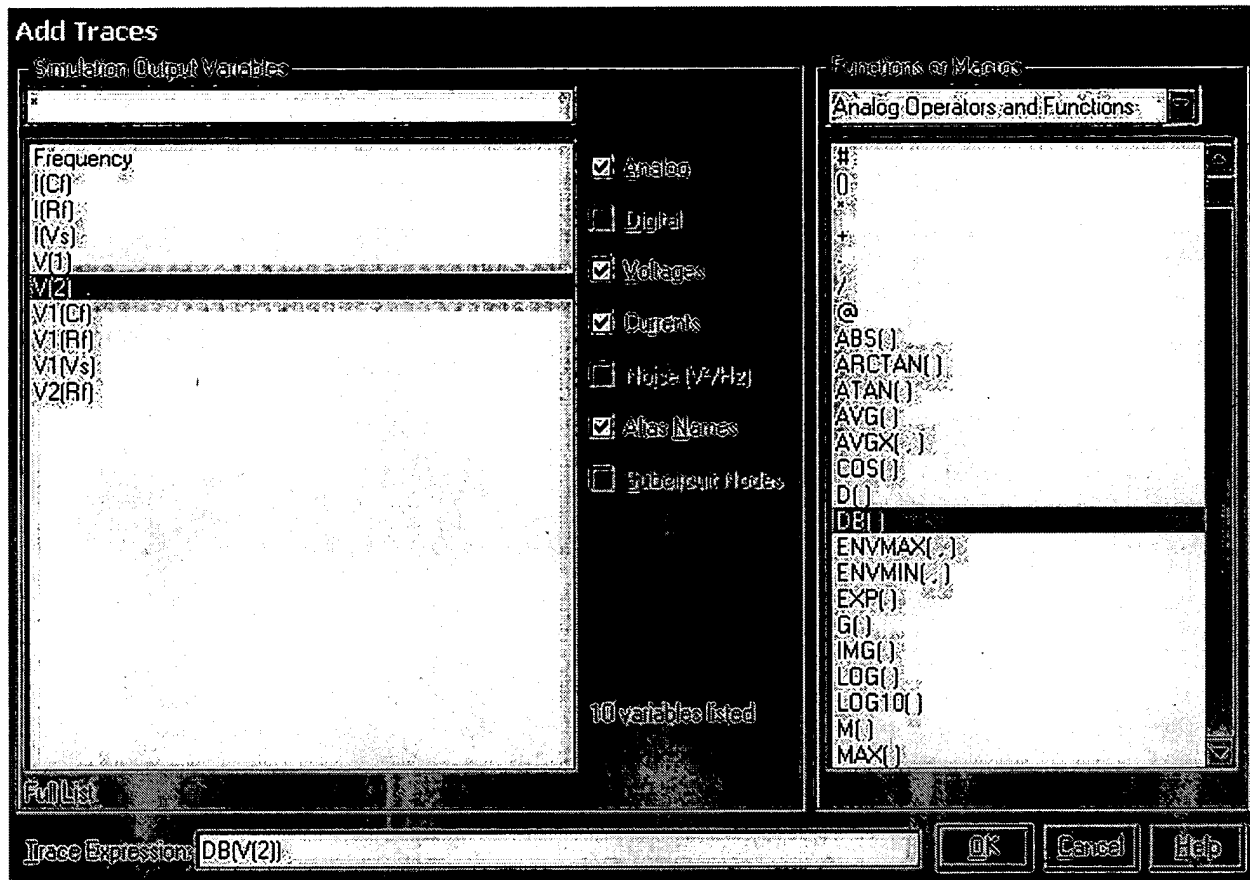
As to claim 22, this is substantially similar to claims 18 and 19 combined, e.g. the limitations of the two claims. As such the rejections to those claims are herein incorporated by reference. The limitation of redrawing is not included in this claim, and so thusly it is ignored.

The only additional limitation is:

Said function comprising at least one of an addition, a subtraction, a multiplication, an exponentiation, a division, a root, a Boolean operator, a modulo, and an absolute value.

Clearly, Sang would imply that such operators could be used, but does not expressly teach that limitation. Rockland teaches the use of a software program called PSpice, which is a circuit simulation program. However, more importantly, this program has a back end for graphical visualization called Probe, which can take in any properly formatted data sets and display them in any combination with various operators (see for example pages 2 and 3, particularly Fig. 1, a zoomed in version of which is herein shown below).





This graphical front-end allowed the user to select any combination of output variables and apply to them any combination of the listed Operators and Functions to generate traces (as shown in Rockland Figs. 2, 4, et cetera), where listed operators are addition, subtraction, multiplication, division, absolute value (ABS), exponential (EXP), and various others that are not shown below.

As such, it would have been obvious to one of ordinary skill at the time the invention was made to apply such a combination of operators to any data subset for visualization purposes so that users could obtain data about the relationships between various variables by applying obvious transforms to real data. Although Probe takes in data files that normally contain circuit data, it can be used to visualize any appropriately

formatted data. Thusly, it would have been obvious to combine Rockland and Sang for the reasons set forth above.

28. Claims 9-11 are rejected under 35 U.S.C. 103(a) as unpatentable over Sang as applied to claim 1 above and further in view of Okerlund et al (US 6,690,371 B1).

Claims 9-11 are the same scope to claims 1-3 but claim that the data dimensions are "a patient dimension, a time dimension, and a procedure dimension" which is just an example of data types which Sang'udi illustrates in different models (figs. 1, 8, 9, 11...); therefore, they are rejected under the same logic, and the rejections to claims 1-3 are herein incorporated by reference. Further, as specified, above the definitions of these terms are very broad. The age of patrons or customers as shown in Figure 2B could easily constitute the "patient" dimension, where the time dimension is clearly shown in Fig. 2B as "Year", as stated in 9:45-55. Clearly, the third dimension – the procedure dimension – could be sales, as clearly a sale is prima facie a type of procedure. The limitation of claim 2 would be incorporated into the first clause of claim 9, and claims 10 and 11 are merely claim 3 split in half, e.g. one of the two dimensional presentations comprising a map, and the other comprising a graph (wherein Sang teaches a graph in Figs. 1 and 2A). Clearly, Figs. 1-2B teach a graph (claim 10) and Figs. 8-11 teach a map (claim 11), thusly covering those recited limitation.

However, Sang does not expressly teach the patient dimension. Clearly reference Okerlund has methods for optimizing data acquired from patients during medical image procedures, e.g. see Figs. 3-6. Clearly, it would be obvious to apply the system of Okerlund to Sang such that individual slices of two-dimensional data over a n-

dimensional volume would be easily visualized, and clearly the system of Okerlund would allow the system of Sang to be applied to situations involving medical data and patients as implied by the claims of the instant application. Thusly, motivation for combination is provided, and also the rejection to claim 1 is herein incorporated by reference.

29. Claims 1, 12, 13, 14, and 15 would be rejected under 35 U.S.C. 103(a) as obvious over Barg et al (US 6,707,454 B1) in view of Gray et al as cited previously. Applicant is encouraged to carefully examine these patents. Basically, the graphs of Barg (e.g. Fig. 2) show a three-dimensional view 122, along with various two-dimensional views of the various axes on the left (various areas labeled 112), which clearly would teach the recited limitations in the way that applicant recites, and Gray teaches the data cube, with the various sides being available in 2-D views. This is extremely well known in the computer visualization art, see for example Fig. 5 in Shekhar et al (Shekhar et al. "Map Cube: A Visualization Tool for Spatial Data Warehouses") and Figs. 3 and 4 in Miller (Miller, Harvey J. "Geographic Data Mining and Knowledge Discovery").

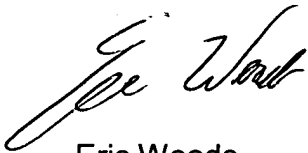
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric V Woods whose telephone number is 571-272-7775. The examiner can normally be reached on M-F 7:30-4:30 alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on 571-272-7664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

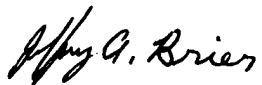
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Eric Woods

April 27, 2005



JEFFERY A. BRIER  
PRIMARY EXAMINER